In the Claims:

Please amend the claims as follows:

1. (currently amended) A tangible computer readable medium having computer-executable instructions that when executed by a computer cause the computer to perform a method for determining an optimal genetic test order for diagnosing mutations that relate to a disease, the method comprising:

a) generating a data set by:

identifying known unique genetic mutations that relate to the disease and the frequency with which each mutation occurs in the population;

identifying assays required to diagnose each of the mutations that relate to the disease;

identifying the average cost of each assay; and

for each assay, identifying the probability of a successful

diagnosis of each of the mutations that relate to the disease;

b) maintaining the data set to include new data received on the mutations that relate to the disease, the frequency distribution of mutations that relate to the disease and the assays required to diagnose the mutations that relate to the disease;

c) applying at least one decision tree algorithm, wherein the at least one decision tree algorithm comprises: (i) generating at least two strategies using the assays within the database; and (ii) ranking the at least two strategies by calculating the strategy expected cost for each of the at least two strategies; ~~and~~

d) identifying, from the ranked at least two strategies, the optimal genetic

test order as the strategy with the lowest expected cost ; and

e) presenting the optimal genetic test order to a user via an output device.

2. (currently amended) The tangible computer readable medium of claim 1, wherein the strategy expected cost is calculated using the formula:

$$Strategy\ Expected\ Cost = \sum_{j=1}^{N} p_j \sum_{i=1}^{T_j} \left(C_{ij} - B_{ij} \right)$$

where *Cij* is a cost of the *i*'th action performed along a *j*'th feasible search path; *Bij* is the value of all incremental benefits attained by the *i*'th action performed along the *j*'th feasible search path; *Tj* is the total number of actions on search path *j*; *N* is the number of feasible search paths generated by a particular strategy; and *pj* is the likelihood that the search path *j* occurs and is approximated by the frequency distribution of empirically observed outcomes.

3. (cancelled)

4. (currently amended) A system for determining an optimal genetic test order for diagnosing mutations that relate to a disease, comprising:

a) a computing environment;

b) an input device, connected to the computing environment for receiving data;

c) an output device, connected to the computing environment, for presenting data; and to a user; and

d) an algorithm device for executing at least one decision tree algorithm based on at least a portion of the data received from the input device, wherein the at least one decision tree algorithm ranks at least a portion of the data and identifies the optimal genetic test order associated with the at least one decision tree algorithm, wherein the optimal genetic test order is the strategy with the lowest strategy expected cost and is presented to a user via the output device.

5. (currently amended) The system of claim 4, wherein the at least one decision tree algorithm further determines a projected cost for each genetic test associated with the

optimal genetic test order, wherein the projected cost is presented to a user via the output device.

6. (previously presented) The system of claim 5, wherein the received data comprises the historical frequency distribution of mutations that relate to the disease and the assays required to diagnose the mutations that relate to the disease.

7. (previously presented) The system of claim 6, wherein the at least one decision tree algorithm is specific to hereditary diseases selected from the group consisting of breast cancer, colorectal cancer, lung cancer, prostate cancer, retinoblastoma, and hereditary hemorrhagic telangiectasia.

8. (previously presented) The system of claim 7, wherein the decision tree consists of at least two strategies.

9. (previously presented) The system of claim 8, wherein the at least two strategies are ranked by projected cost.

10. (previously presented) The system of claim 9, wherein the at least two strategies comprise at least two assays.

11. (previously presented) The system of claim 10, wherein the at least two strategies are ranked based on minimum projected cost to perform the at least two assays.

12. (currently amended) A method of determining an optimal genetic test order for diagnosing mutations that relate to a disease, comprising:

a) generating a data set by:

identifying known unique genetic mutations that relate to the disease and the frequency with which each mutation occurs in the population;

identifying assays required to diagnose each of the mutations that relate to the disease;

identify the average cost of each assay; and

for each assay, identify the probability of a successful diagnosis of each of the mutations that related to the disease;

b) maintaining the data set to include new data received on the mutations that relate to the disease, the frequency distribution of mutations that relate to the disease and the assays required to diagnose the mutations that relate to the disease;

c) applying at least one decision tree algorithm, wherein the at least one decision tree algorithm comprises: (i) generating at least two strategies using the assays within the data set; (ii) ranking the at least two strategies by calculating the strategy expected cost of the at least two strategies; ~~and~~

f) identifying, from the ranked at least two strategies, the optimal genetic test order as the strategy with the lowest strategy expected cost ; and

g) presenting the optimal genetic test order to a user via an output device.

13. (previously presented) The method of claim 12, wherein applying at least one decision tree algorithm comprises:

a) accessing a set of records within the data set;

b) generating at least two strategies from the accessed records;

c) comparing the at least two strategies against each other; and

d) calculating the projected cost for the at least two strategy strategies identified by the comparing step.

14. (previously presented) The method of claim 13 wherein the projected cost is calculated from a pre-selected minimum number of records within the data set.

15. – 21. (cancelled)

22. (previously presented) The method of claim 12, wherein the strategy expected cost is calculated using the formula:

$$Strategy\ Expected\ Cost = \sum_{j=1}^{N} p_j \sum_{i=1}^{T_j} \left(C_{ij} - B_{ij} \right)$$

where *Cij* is a cost of the *i*'th action performed along a *j*'th feasible search path; *Bij* is the value of all incremental benefits attained by the *i*'th action performed along the *j*'th feasible search path; *Tj* is the total number of actions on search path *j*; *N* is the number of feasible search paths generated by a particular strategy; and *pj* is the likelihood that the search path *j* occurs and is approximated by the frequency distribution of empirically observed outcomes.